

UK GEMINI: A **Geo**-spatial **Meta**data Interoperability **Ini**tiative

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UK GEMINI: A Geo-spatial Metadata Interoperability Initiative

An introduction to the objectives processes and parties involved in the GEMINI project.

Geospatial information is more than maps; it refers to all information resources – documents, spreadsheets, datasets etc, which have an associated geographical reference. It has been estimated that about 80% of government information resources fall into this category. Presumably, this is true for information of all kind even if the location is virtual. In order to integrate this data, so that all information about one area can be compared graphically, the locations must be described in an interoperable way. This is accomplished with detailed and descriptive metadata of the resource. In order for this metadata to become fully useful and accessible, it needs to be created in a standardised way.

1. Scope

UK GEMINI is a programme of work to define an element set for describing geospatial, discovery level metadata. This will enable organizations to create, for any given resource, a single set of metadata that will be compliant with relevant national and international standards, specifically ISO 19115 and UK eGMS. It will be created for use by United Kingdom organisations, but will be openly available to all, and will be suitable for describing resources covering any geographic area.

2. Goals

The Office of the e-Envoy, in conjunction with the UK Data Archive and the Association for Geographic Information (AGI), propose that a new core of metadata elements be identified to support the creation of geo-spatial metadata across the United Kingdom. The ISO 19115 standard for geo-spatial metadata, which was approved in March 2003, will serve as the source for these elements.

3. Participants

The GEMINI Committee comprises representatives from the Office of e-Envoy, the UK Data Archive and the Association of Geographic Information (AGI).

The GEMINI Stakeholders Group comprises representatives of organisations from divergent sectors and disciplines. This includes the geo-spatial community and other organisations with experience in developing standards and metadata practices.

The Office of the e-Envoy is part of the Prime Minister's Delivery and Reform team based in the Cabinet Office. The e-Envoy is responsible for ensuring that all government services are available electronically by 2005 with key services

achieving high levels of use. It is also noted for its development of the e-Government Metadata Standard (e-GMS).

The UK Data Archive is a resource centre that acquires, disseminates, preserves, and promotes the largest collection of digital data in the social sciences and humanities in the United Kingdom. Its primary aim is to support secondary use of quantitative and qualitative data for research and learning.

The Association for Geographic Information, a professional, member-supported organisation, plays a pivotal role in developing and promulgating geographic information policy in the UK so as to maximise the use of geographic information for the benefit of the country. The AGI also manages the GIGateway™, a gateway service for metadata discovery and, ultimately, access to complex geospatial datasets

4. Objectives

The committee has laid down steps which should be taken both to select the most suitable elements for the metadata element group and to sustain efforts in application profile and customised schema development.

Within this work, the following objectives should be achieved:

- establishment of a working group of stakeholders and of meetings for review of discussion paper, ISO 19115 overview and consideration of potential stakeholders;
- identification and review of other relevant standards and of other organisations with established track records in geospatial metadata and standards implementation;
- establishment of criteria, objectives and constraints effecting the process and the final outcomes;
- publication of the element set and launch at the GeoSolutions conference in 2004;
- establishment of ways of sustaining collaborative efforts between organisations to address future changes and support of application profile and customised schemas for the respective interests.

5. Background

A meeting, held at the Office of the e-Envoy on the 9 of April 2003, recognised the need for the creation of a universal geo-spatial metadata element set for the United Kingdom. This set would draw on elements of the recently adopted ISO 19115 metadata standard, which was approved in March 2003. The strategy would be to select and present a list of ISO elements to a working group of stakeholders for their review and consideration. Subsequently, the working group would select a

group of elements that would be deemed universally acceptable among the members of the geo-spatial community.

As a first step the UK Data Archive prepared a discussion paper proposing measures and methods for moving the process forward. This would establish the basis for further discussion and a process for selecting a universal element group.

Since the late 1990s, the National Geospatial Data Framework's (NGDF) metadata standard has served the United Kingdom's geo-spatial community. The NGDF standard is a derivative of the Federal Geographic Data Committee's (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM), which has been the source for the creation of many application profiles. The recent approval of the ISO 19115 geo-spatial metadata standard introduced a new geo-spatial standard and led to the current consideration of a new group of elements. Upon completion of the ISO 19139 Dataset Implementation Model and Schema development phase, which is currently under way and is expected to be finished in early 2004, it is expected that the adoption of the ISO 19115 will become ubiquitous internationally as a standard and it therefore be necessary to adopt it here in the United Kingdom.

This paper sets out the tasks which should be accomplished in order to identify a subset of the ISO 19115 elements suitable for the United Kingdom.

6. Activities

It is recommended that the element selection process encompasses the following activities to assure a successful outcome.

- Meeting and other communication between the Stakeholder working group to comment on and discuss the element set.
- As part of the process to select a list of ISO 19115 elements, the following standards should be reviewed:
 - ✓ ANZLIC Metadata Standard (Australia and New Zealand);
 - ✓ CGSB 171.3-74 - CDN Federal Geospatial Metadata Content Standard (Canada);
 - ✓ Dublin Core;
 - ✓ Data Documentation Initiative for Social Science Datasets (DDI);
 - ✓ UK Office of the e-Envoy's e-Government Metadata Standard (eGMS);
 - ✓ The FGDC's Content Standard for Digital Geospatial Metadata (CSDGM);
 - ✓ National Geospatial Data Framework (NGDF) Standard.

In addition to a review of standards, Stakeholder activities should entail the following:

- consider and select stakeholders to form a working group;
- review practices of other organisations or projects to determine the best approaches and strategies for implementing this effort. There are a number of

geo-information and interoperability initiatives and activities associated with the following:

- ✓ INSPIRE;
- ✓ IGGI;
- ✓ EUROGI;
- ✓ Open GIS Consortium.

Further information about each of these initiatives can be found in Appendix A.

Set criteria and processes for selecting and approving elements, including:

- identify and review ISO 19115's mandatory elements and then consider the issues surrounding the adoption of these elements. One example is the *Topic* element. There may need to be further discussion about the expanding the term definitions;
- define a threshold for the element group. The inclusion of a threshold improves the likelihood of reaching a consensus for element selection amongst a cross-sectional group of divergent stakeholders;
- hold wider consultations about elements and thresholds;
- develop strategies to introduce selected elements to the UK geo-spatial community;
- discuss the concept of custom schema and extensions with stakeholders. The emphasis should be placed on conformity with the standard and ways to tailor it to represent locally defined elements.

7. Timetable

August 2003	Consultant to prepare first draft of element set
1 September	Distribute first draft of element set to Stakeholders
10 October	First meeting of GEMINI Stakeholders.
1 December	Draft sent out for public consultation.
31 January	End of first public consultation.
11 February 2004	Meeting of GEMINI Stakeholders
March/April	Second public consultation if needed
Early May	GEMINI Stakeholders meeting
Late June	Final document set for publication
GIS 2004	Official launch at GIS

This gives the sequence of events and approximate timeline. Time has been allowed for the widest possible consultation and discussion.

8. Conclusions

It is critical that this process is carefully formulated and deliberated to assure inclusiveness and acceptance across the entire UK geo-spatial community. It is likely to be a process that is drawn out over considerable time and shouldn't be

pushed through expeditiously. It will also be important to pull in key stakeholders to establish a working group, and use other standards and projects as references for additional project guidance and element selection.

It will be equally important to establish guidance and support mechanisms for the respective geo-spatial groups to create custom schema or extensions based on the ISO 19115 so that each can generate a working application profile that best suits each one's specialisation.

Appendix A: Glossary, references

ANZLIC

ANZLIC is the Spatial Information Council's joint initiative of the Australian Government, the New Zealand Government and the governments of the States and Territories of Australia. ANZLIC's role is to facilitate easy and cost effective access to the wealth of spatial data and services provided by a wide range of organisations in the public and private sectors.

ANZLIC has been at the forefront with the mapping of its geo-spatial metadata standard to ISO 19115.

<http://www.anzlic.org.au/index.html>

Association for Geographic Information

The AGI plays a pivotal role in developing and promulgating geographic information policy in the UK so as to maximise the use of geographic information for the benefit of the country. The AGI also manages the GIGateway™ data locator web site, a gateway service for the data discovery. It is also maintains the current GIGateway™ Discovery Metadata Specifications (previously known as the National Geospatial Data Framework (NGDF)), a geo-spatial metadata standard for the UK. This standard was a derivative of both the ANZLIC and FGDC standards.

<http://www.agi.org.uk/>

Content Standard for Digital Geospatial Metadata (CSDGM)

The Canadian's Federal Geospatial Metadata Content Standard is derived from the FGDC's standard. As it stands, the US and Canada will collaborate to create a North American profile of the ISO 19115.

It was created by the Federal Geographic Data Committee (FGDC) to provide a common set of terminology and definitions for the documentation of digital geo-spatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements.

<http://www.fgdc.gov/>

DDI (Data Documentation Initiative)

The Data Documentation Initiative (DDI) is an effort to establish an international criterion and methodology for the content, presentation, transport, and preservation of "metadata" about datasets in the social and behavioural sciences. Metadata (data about data) constitute the information that enables the effective, efficient, and accurate use of those datasets. DDI is written in eXtensible Markup Language, or XML.

The Data Documentation Initiative (DDI) is mapped to Dublin Core and is essential for the content, presentation, transport, and preservation of metadata about datasets in the social and behavioural sciences. A proposal is under way to include additional

elements for defining geographical extents. Under review are the bounding rectangle and polygon extents. These will tie into both the FGDC and ISO standards.

<http://www.icpsr.umich.edu/DDI/>

Dublin Core (ISO 15836)

A metadata element set that is specifically designed to describe digital resources. There are fifteen elements in total (e.g., Title, Creator), which you can qualify with sub elements. It can be used as descriptive metadata to describe objects, containers, and collections.

At present, the ISO 19115 has not been mapped to Dublin Core; however a workshop initiative is underway to map between the two. The Metadata-Dublin Core (MMI-DC) workshop, which falls under the auspices of the European Committee for Standardization (CEN) and the Information Society Standardization System (ISSS), is expected to complete a mapping during the third quarter of 2003.

<http://www.dublincore.org>

e-Government Metadata Standard (e-GMS)

The e-Government Metadata Standard (e-GMS) provides the list of elements and refinements used by the UK public sector to create metadata for information resources. It also gives guidance on the purpose and use of each element. This standard is also mapped to Dublin Core.

http://www.purl.oclc.org/net/e-GMS_v2

EUROGI the European Umbrella Organisation for Geographic Information

EUROGI was established at the end 1993 as an initiative of the European Commission. Its mission is to maximise the effective use of geographic information for the benefit of the citizen, good governance and commerce in Europe to represent the views of the geographic information community to promote, stimulate, encourage and support the development and use of geographic information and technology

http://www.eurogi.org/index_1024.html

Federal Geographic Data Committee

The FGDC is the authoring body of the Content Standard for Digital Geospatial Metadata (CSDGM). It also promotes the co-ordinated development, use, sharing, and dissemination of geographic data. It is composed of representatives from the Departments of Agriculture, Commerce, Defence, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality,

and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

<http://www.fgdc.gov/>

IGGI (Intra-governmental Group on Geographic Information)

The Intra-governmental Group on Geographic Information was established in 1993 following the Chorley Report, to enable departments to liaise effectively and exchange best practice for geographic information. IGGI's mission is to increase the efficiency of central government while enabling it to meet its responsibilities for provision of geographic information to the general public.

http://www.iggi.gov.uk/about_iggi/iggi.htm

INSPIRE (Infrastructure for Spatial Information in Europe)

INSPIRE is a recent initiative launched by the European Commission and developed in collaboration with Member States and accession countries. It aims at making available relevant, harmonised and quality geographic information to support formulation, implementation, monitoring and evaluation of Community policies with a territorial dimension or impact.

<http://inspire.jrc.it/home.html>

ISO (International Organization for Standardization)

A worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electro-technical Commission (IEC) on all matters of electro-technical standardisation.

<http://www.iso.ch>

ISO 19115 International Metadata Standard

This International Standard, adopted March 2003, defines the schema required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data. A separate ISO 19139 Dataset Implementation Model and Schema is currently being developed and is anticipated to be released during the first quarter of 2004.

<http://www.iso.ch> <http://www.nima.mil/>

GIgateway™ - Geographic Information Gateway

GIgateway™ is a web service aimed at increasing awareness of and access to geospatial datasets and geographical information in the UK. Funded by the Government through the National Interest Mapping Services Agreement (NIMSA),

GIgateway™ is a not-for-profit service set up specifically to address GI industry wide problems. AGI currently contracts with Ordnance Survey for the delivery of this program.

<http://www.gigateway.org.uk>

National Geospatial Data Framework (NGDF)

The National Geospatial Data Framework (NGDF) was a name given to the geo-spatial data infrastructure of the United Kingdom. This initiative aimed to improve awareness and access to geo-spatial information and encourage its wider use. The NGDF's mission was to encourage greater awareness of data availability and improve access to it, expand the market for geospatial information, assist with data integration leading to more practical solutions to everyday problems to avoid data duplication, make people aware of what geo-spatial data was available, improve methods of data management and fill the gaps in the market place for data supply where none existed. The NGDF evolved into the askGIraffe service, which was the predecessor to GIgateway™.

<http://www.agi.org.uk/>

Office of the e-Envoy

The Office of the e-Envoy is part of the Prime Minister's Delivery and Reform team based in the Cabinet Office. The primary focus of the Office of the e-Envoy is to improve the delivery of public services and achieve long term cost savings by joining-up online government services around the needs of customers. The e-Envoy is responsible for ensuring that all government services are available electronically by 2005 with key services achieving high levels of use. It is also noted for its development of the e-Government Metadata Standard (e-GMS) for the public sector.

<http://www.e-envoy.gov.uk/Home/Homepage/fs/en>

Open GIS Consortium

OGC is an international industry consortium of 258 companies, government agencies and universities participating in a consensus process to develop publicly available geo-processing specifications. Open interfaces and protocols defined by OpenGIS® Specifications support interoperable solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT, and empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications.

<http://www.opengis.org/>

Ordnance Survey

Ordnance Survey is the national mapping agency of Great Britain. Although a UK government agency, it is funded through the commercial sales of its products. There are some activities which are in the National Interest and are not commercially viable. These activities are funded by the government and delivered by OS and come under the heading of NIMSA (National Interest Service Agreement). GIgateway™ is one of those services which is further subcontracted by OS to AGI.

<http://www.ordsvy.gov.uk/>

UK Data Archive

The UK Data Archive is a resource centre that acquires, disseminates, preserves, and promotes the largest collection of digital data in the social sciences and humanities in the United Kingdom. Its primary aim is to support secondary use of quantitative and qualitative data for research and learning.

This may also lead to future collaborative efforts among the divergent UK geo-spatial communities to develop metadata profiles and customised schemas to suit their respective needs. The UK Data Archive plays a key role in the Data Documentation Initiative (DDI) for the social sciences.

<http://www.data-archive.ac.uk/>

Appendix B: Acknowledgements

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